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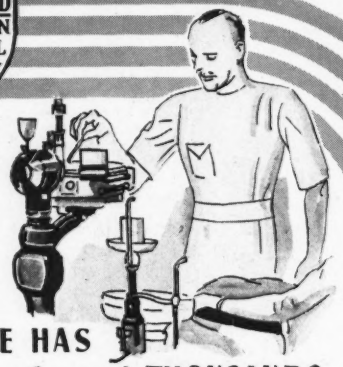

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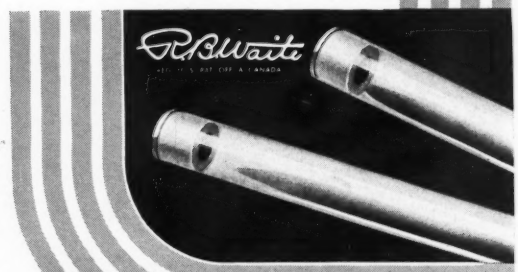

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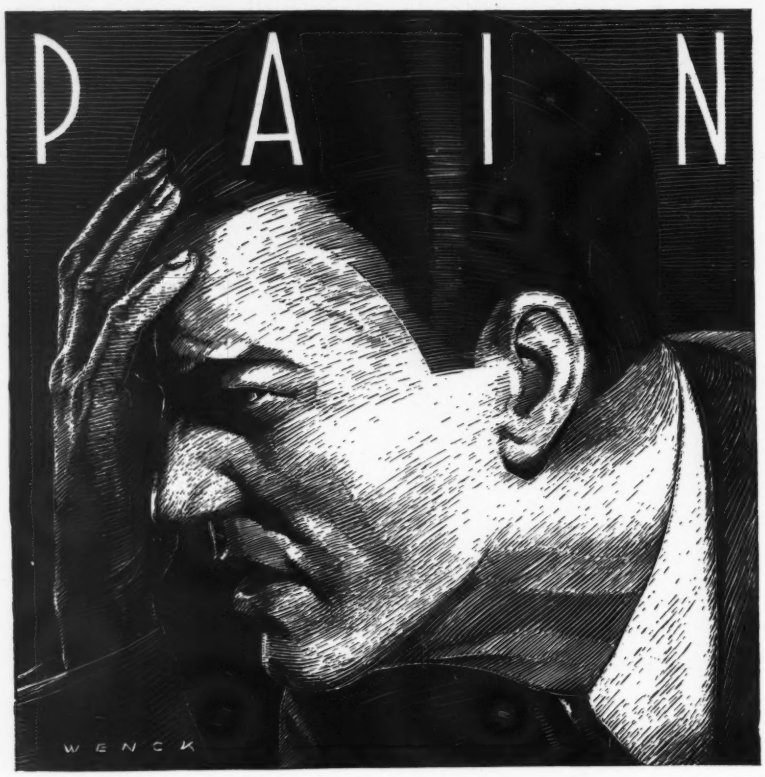

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The DENTAL DIGEST

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EDWARD J. RYAN, B. S., D. D. S., Editor
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SILICATE CEMENTS: BEHAVIOR AND TECHNIQUE

J. W. ROUSH, D.D.S.
Oakland, California

DENTISTS generally express dissatisfaction with the results they are getting in their silicate work. Good or bad, silicate restorations are being used increasingly, and by most dentists, they are used with the idea that they are doing the best that can be done with the material.

Most of the silicate restorations ordinarily seen could have been greatly improved. A working knowledge of the behavior of the material under various physical conditions, and strict attention to the details of manipulation technique are essential factors in the successful use of silicate cements.

The Powder

The formula of the powder of the simplest silicate is about as follows:

Silica	from 40 to 45 per cent
Aluminum oxide	35 to 50 per cent
Calcium, potassium, sodium, oxides	5 to 10 per cent
Coloring and other constituents	small amounts

From the formula, it will be seen that silica and aluminum oxide with small amounts of alkaline substances make up the bulk of the powder.

The Liquid

The liquid is orthophosphoric acid and water, usually buffered with zinc and aluminum oxides. Water is readily lost from the liquid when exposed to a dry atmosphere and taken on when exposed to humid conditions. It is, therefore, imperative that the liquid bottle be open to the air as little as possible in order to preserve the balance.

Contraction or Shrinkage

There are two kinds of contraction to be dealt with in the silicates:

1. When restorations dry out to any extent, they contract greatly and often develop a surface condition with innumerable fractures. When they are again moistened they absorb water and expand but never exactly to the original size. Especially is this true of drying out in the early setting stages.

2. Contraction occurs in most of the silicates on the market when they set. This quality, however, depends on the acid concentration of the liquid. If the water content of the liquid is evaporated as in a dry atmosphere, this setting contraction can be eliminated, and if enough water is evaporated, expansion will occur on setting.

It would seem from the foregoing, that the liquid should be concentrated to the point where slight expansion would occur. The disadvantages are three-fold: The concentrated acid makes a restoration that is dangerous to the pulp and one that sets slowly; and because of the acid the color is not so good.

Practical Application

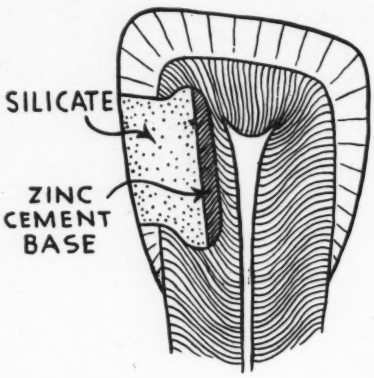
The practical application of this information on shrinkage calls for the following comment:

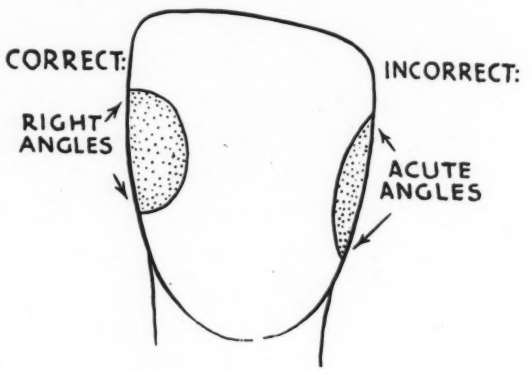
1. Coat all silicate restorations with cocoa butter or varnish or both while dentistry is being done on other teeth if these are where they will dry out from the rubber dam or as a result of holding the mouth open for any length of time.

2. Scrupulously avoid the drying out or dehydration of a restoration just placed. Immediately on removing the celluloid strip, cocoa butter should be applied for a few minutes. Then the cocoa butter may be wiped off leaving only an oily surface which should be covered with one or preferably two coats of varnish. Some prefer a covering of paraffin or wax to varnish.

3. If the material being used sets slowly, it is usually due to the evaporation or concentration of the liquid. Great care should be taken in this case to isolate the pulp with cavity varnish or a zinc phosphate cement base. In a slow-setting restoration, movement of the celluloid strip may draw it away from one margin before the restoration is hard and damage it materially. The damage from drying out in early stages applies especially to a slow-setting silicate. These precautions should be observed in using the so-called expanding silicates.

4. By actual experiment it seems that a filling of a thin mix shrinks more than one of a thick mix.





Figs. 1 and 2—Cavity preparation.

Temperature and Humidity

A temperature near 70° F. on a dry day is close to ideal for silicates.

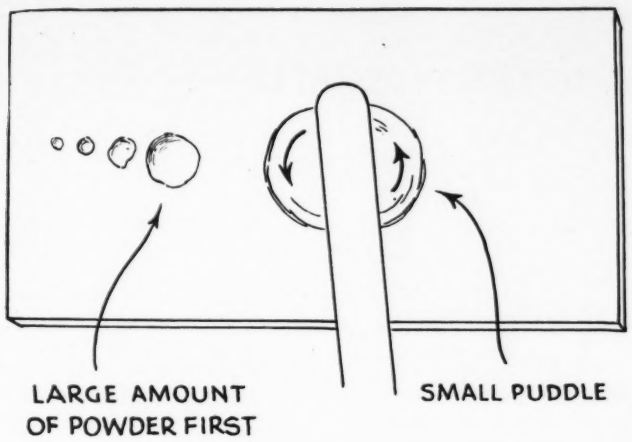


Fig. 3—Method of mixing.

The mixing slab may be cooled on warmer days but never to the dew point, or moisture will be incorporated into the mix. If the humidity is high a warmer slab may be used with limitations.

A direct draft of air, as from an open window or door while mixing or placing in the cavity is undesirable for evident reasons. The window or door should be closed for the time.

Solubility

The different brands of silicates show slight differences in solubility when placed in distilled water. In weak lactic acid solutions a small amount of solubility occurs. The wear and tear on silicate restorations in some mouths is greater than in others. The viscosity of the saliva and character of foods eaten undoubtedly affect silicate restorations in the mouths of some patients.

Devitalization

Devitalization of the pulp under silicate restorations may be due to several causes, as follows:

1. Acid irritation during early setting stages. Especially is this true in children's teeth in which the pulps are near the surface and the dentinal tubules are large in diameter. Deeper cavities should have a cement base and shallower cavities a varnish lining.

2. Compression of the thin pulpal wall against the pulp in deep cavities when the restoration is placed is sometimes the cause of a devitalized pulp. Cement flowed into such a cavity and allowed to harden after an application of phenol is dried-in and before the silicate is placed tends to prevent devitalization of the pulp (Fig. 1).

3. The pulp may have become infected from carious processes previous to placing the restoration and thus may have become devitalized afterward.

4. Exposure of pulp during cavity preparation may have gone unobserved.

Cleanliness

Absolute cleanliness should be observed to prevent interference with the chemical reactions involved. The slab should be free from scratches that may have caught previous materials. A perfectly clean spatula is imperative. The slab and spatula should likewise be free from oil or grease.

Indications

The use of silicate cements is indicated in the following conditions:

1. Pit and narrow fissure cavities in incisors, cuspids, bicuspids, and molars.

2. Proximal cavities in incisors and cuspids in which the angle is not involved. When the angle is involved a gold inlay with a silicate facing is sometimes used. In such cases, an effort should be made to reproduce the tooth curvature in the facing, because a flat facing is unsightly. The depth of the cavity in the gold inlay has a great deal to do with the appearance of the facing-filling.

3. Temporary facings for bridges, temporary jacket crowns, and facings for full veneer crowns.

4. Gingival cavities; this is probably the least desirable of all indicated locations.

Cavity Preparation

1. Cavities should be kept as small as possible.

2. The margins should be at right angles to the surface and not beveled. A smooth margin will result in more sightly restorations in years to come; it pays to spend a little additional time on the margin.

3. Undercuts provide retention and are probably better made with a round bur (Fig. 2).

Instruments

The following equipment is required: (1) a thick glass slab or water bottle (to hold temperature); (2) an agate or stellite spatula; (3) stainless steel placing instruments; (4) cocoa butter; (5) varnish; (6) thin celluloid strips.

Manipulation Technique

1. Mixing and placing in the cavity are all-important. No time should be lost from the time the mix is begun until the restoration is placed and the celluloid strip drawn. Loss of time here may greatly shorten the life of the restoration.

2. The mix should be made as thick as possible yet not so thick as to interfere with plasticity, for of the two, plasticity is the more important.

3. Moisture must be excluded from the mix for some time. The effect of moisture on the silicate cement in the early stages can be seen by placing the slab with a mix on it in water for a few minutes.

4. For a proximal restoration, place the celluloid strip in position before mixing.

5. Modeling compound or pink wax may be used as an aid to holding the strip lingually where there is irregularity.

6. Tin foil lubricated with cocoa butter may be used instead of celluloid on pit and fissure cavities.

7. Silicates seem to hold better in pit and narrow fissure cavities than in any other kind of cavity.

8. Mixing should start immediately after the liquid has been placed on the slab.

9. Draw in large amounts at first, then smaller and smaller portions, using rotary motion of the spatula, keeping the puddle small, and scraping the whole mass up occasionally and folding over (Fig. 3).

10. When packing into the cavity, one should be careful not to trap air. A stainless steel explorer inserted into the mass in a small cavity will release air pockets; then by slight agitation of the explorer a homogeneous condition can easily be secured. The

(*Continued on page* 434)

Fig. 4—Packing mix into cavity.

STERILE SURGICAL MAGGOTS

DOUGLAS H. IRWIN, D. D. S.
Kansas City, Missouri

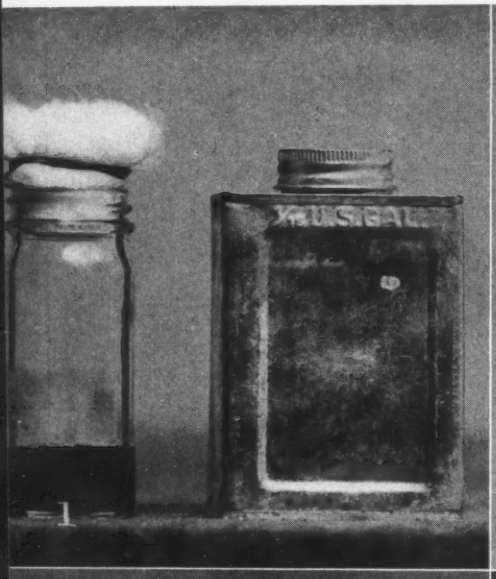
AMONG the developments of modern medicine, one of the most fascinating is that of maggot therapy, because, instead of being a menace, the insect contributes to the healing of diseased tissue. Maggot therapy is not new; in its cruder aspects maggot therapy was current during the conquests of Napoleon. It is true that this form of therapy was not used intentionally at that time, but the benefit derived from the accidental implantation of maggots in suppurating wounds was fully recognized.

Review of the Literature

Ambroise Pare,[1] in the year 1557, said, "It was found that the wounds were excessively fetid and full of worms, with gangrene and corruption. The presence of these insects in the wounds appeared to accelerate their suppuration. Although these insects were troublesome, they expedited the healing of the wounds by shortening the work of Nature and causing the sloughs to fall off." The first authentic intentional use of maggots is ascribed[2] to Zaccharias, a surgeon in the Confederate Army during the Civil War, who writes as follows:

[1]Paré, Ambroise: Journey to Bayonne, 1564; The Battle of Saint Quentin, 1557. Packard: Ambroise Paré, New York, Paul B. Hoeber, Inc., Second Edition, 1926. Johnston: Ambroise Paré, London, 1678, Editions of 1634 and 1665, Translation of Works of Ambroise Paré, London, 1678, Book 10, page 249.

[2]Roberts, E. F.: The Clinical Application of Blow-Fly Larvae, Scientific Monthly, 34:532 (June) 1932.



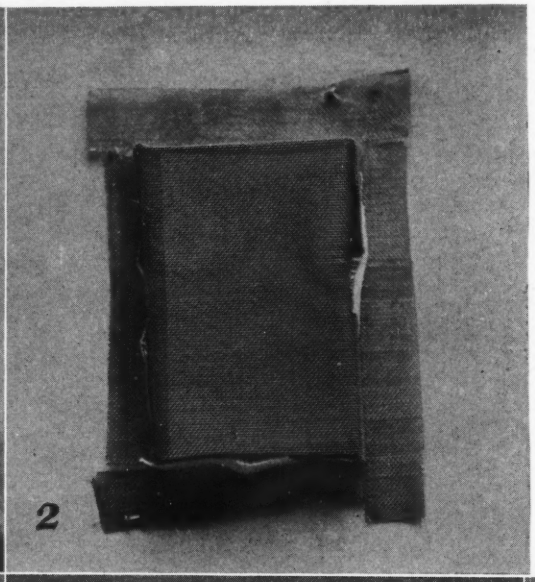


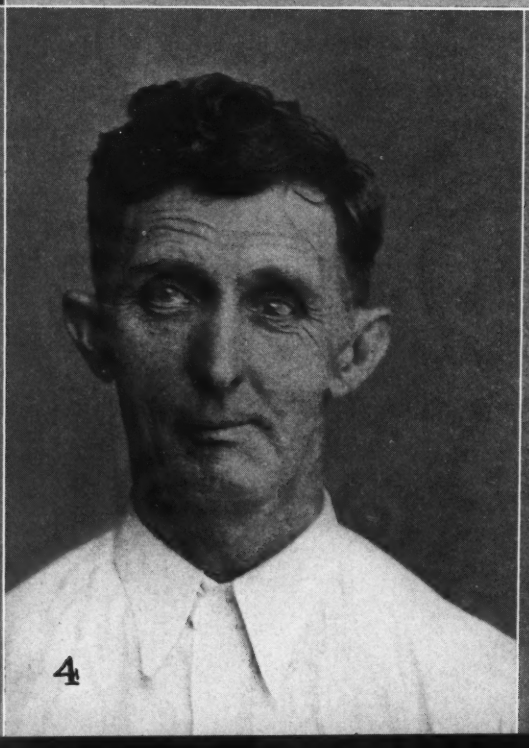
Fig. 1—Maggots are shipped in bottles of one thousand each, the dark substance at the bottom of the bottle being sterilized macerated liver. The bottle is packed against the can of ice to inhibit the growth of the larvae while in transit.

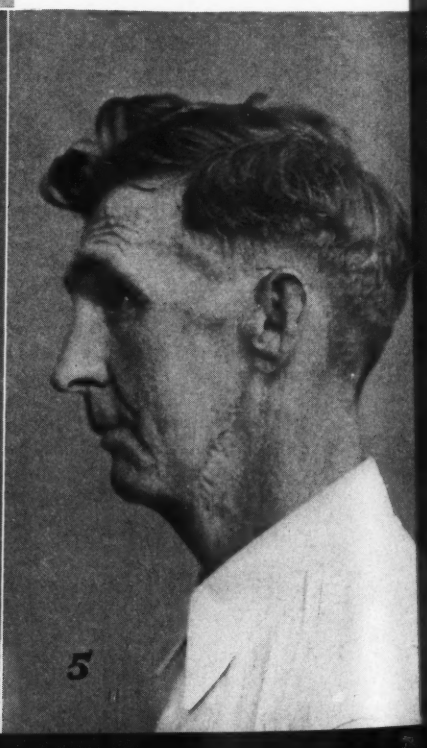
Fig. 2—Type of cage constructed of fine mesh bronze wire used to confine maggots within the wound for the first twelve hours. It is held in place by strips of adhesive tape.

Fig. 3—Method of taping wire cage in position on jaw.

Fig. 4—Slight lowering of left eye due to fracture of zygoma and floor of orbit.

Fig. 5—Wound healed with minimum scar formation after use of maggots.





During my service in the hospital at Danville, Virginia, I first used maggots to remove the decayed tissue in hospital gangrene and with eminent satisfaction. In a single day they would clean a wound much better than any agent at our command. I am sure I saved many lives by their use, escaped septicemia and had rapid recoveries.

The greatest momentum to clinical application of the blow-fly larvae was derived from Doctor Baer's investigations[3] during the late World War in which he states that at that time the mortality of compound fractures of the femur was from 75 to 80 per cent, even when the wounded had had the best of care. On the other hand, he cites two cases in which two wounded men with compound fractures of the femur had lain on the battlefield without food or water for seven days and had recovered. In fact, their condition on admittance to the hospital was better than that of those patients who had received the ordinary care up to that time. This was explained by the fact that the wounds were completely filled with maggots. On Doctor Baer's return to civil practice, he proceeded to carry out the ideas which he had gained in France for the treatment of chronic osteomyelitis, with surprising and brilliant results. It was found, however, that some means of sterilization to eliminate the tetanus, bacillus, gas gangrene, and various other organisms was necessary. His pioneer work was so well developed that today the treatment is being supplied throughout the United States and the Philippine Islands.

Robinson and Simmons[4] have discussed the technique for producing sterile maggots. They state that the rearing of maggots is carried on best in small lots of from 700 to 1000.

All the equipment is sterilized in a hot air oven at 150° C. to 160° C. for an hour. Food for the larvae is supplied in the form of meat and eggs.

Actual counting of the number of eggs laid by the blow-fly is a laborious process; therefore, the determination of the number by weight is used; that is, a constant is obtained by taking numerous egg masses from different colonies, weighing them, counting them, and thus arriving at an average. After hatching, feeding of the larvae for three days is sufficient to produce maggots large enough for shipping. They are packed with a can of dry ice, the low temperature inhibiting their further growth until ready for use (Fig. 1).

Fig. 6—Eversion of wound. Maggots in place.

An exhaustive study was also made by Robinson and Norwood[5] in which they state that:

Sterile maggots function largely to remove dead tissue and pus from the wound. At the same time the maggots take up large numbers of bacteria from the wound and by destroying them aid in reducing the infection.

Ferguson and McLaughlin[6] have reported on maggot therapy as a rapid method of removing necrotic tissue. Not only have chronic bone lesions been treated with great success by these men but many other types of suppurative lesions. Maggot therapy is most useful probably in osteomyelitis. Ferguson and McLaughlin describe thirteen cases about which they state that:

Maggot therapy was of definite benefit in ten cases and was helpful in the other three. Our experience leads us to recommend maggot therapy in osteomyelitis, especially in the chronic type. It definitely hastens the removal of dead bone and necrotic tissue and stimulates granulation.

Further than this, maggot therapy was used in eight cases of carbuncles, six sloughing ulcers of the leg; seven cases of gangrene, and various other conditions, such as:

Bed sores, subcutaneous abscesses, gangrene of the scrotum, and even some suppurative and necrotic lesions of the chest. After wide incision and packing of the wound for from twenty-four to forty-eight hours, maggots were introduced. The wounds were often clean and granulating from twenty-four to forty-eight hours later.

Treatment of Osteomyelitis of the Jaws

In some cases of osteomyelitis of the jaws of recent onset, resulting from a compound fracture, the acute process may be limited to as short a time as ten days, requiring not more than two applications of maggots to effect a cure. Most maggot treatments require six applications. The number of treatments required depends on the amount of necrotic tissue to be removed. If during treatment, sequestra appear in the depth of the wound, they may be gently lifted out. The removal of these sequestra, from time to time, greatly facilitates the treatment. Maggot therapy accomplishes perfect healing in the shortest possible time with a minimum formation of scar tissue. Draining sinuses are eliminated entirely and function is restored with the least impairment. These accomplishments are possible because an agent is used which distinguishes between living and dead tissue. Undoubtedly, great numbers of bacteria are ingested by the maggots along with the liquefied necrotic tissue.

The wound proper changes from an acid reaction which is favorable to bacterial growth to an alkaline reaction, brought about by the liquefaction of protein by the larvae. The removal of necrotic tissue is accomplished by actual injestion by the maggots, this process being hastened by their ability to liquefy their food. Hidden pockets of infection which if treated by surgery alone would remain undiscovered and perpetuate the disease are sought out and freed of necrotic matter. If too many maggots are used the secretions will become over-abundant and some means of absorbing this material must be

[3] Baer, W. S.: The Treatment of Chronic Osteomyelitis with the Maggot, J. Bone & Joint Surg. 13:438 (July) 1931.

[4] Robinson, William; and Simmons, S. W.: Surgical Maggots in Treatment of Infected Wounds: Recent Apparatus and Methods in Maggot Production and Research, J. Lab. & Clin. Med. 19:339 (January) 1934.

[5] Robinson, William; and Norwood, V. H.: Destruction of Pyogenic Bacteria in Alimentary Tract of Surgical Maggots Implanted in Infected Wounds, J. Lab. & Clin. Med. 19:581 (March) 1934.

[6] Ferguson, L. K. and McLaughlin, C. W., Jr.: Maggot Therapy: A Rapid Method of Removing Necrotic Tissues, Am. J. Surg. 29:72 (July) 1935.

Fig. 7—Roentgenogram showing complete necrosis of left side of mandible and ramus indicating its total loss.

Fig. 8—Loss of a good portion of necrotic bone.

Fig. 9—All bone has been removed except a small portion at angle.

Fig. 10—Slight building-in process, indicating the presence of uncalcified bone. At this time the maggots were being used freely.

used. Owing to the rapidity of healing by second intention, the part assumes its normal rounded form, eliminating depressed scars. Stimulation of healing is a marked effect of maggot therapy. The tissues are apparently able to utilize the excessive calcium which is part of the excreta of the maggots. Compact granulation tissue grows up to fill the wound, leaving only the epithelium to spread over it, complete the healing process, and thus reduce disfiguration from deep pitting.

Technique for Application of Maggots

As the majority of fractures of the jaw occur in the mandible, it is the treatment of the lower jaw that is most important.

1. The technique for the application requires an operation preceding the implantation of maggots and must be of sufficient scope to open the wound wide and facilitate the removal of all accessible sequestra. No chemical agents are to be used at this time, the wound simply being packed as widely as possible with sterile gauze. Packing serves the purpose of arresting the hemorrhage and causing an eversion of the incised tissues, thus facilitating the introduction of the maggots.

2. Usually this will have been accomplished within twelve hours of the initial operation, at which time the maggots are introduced by whatever method the operator finds most applicable to his individual needs.

3. A good method is to suspend the maggots in a sterile physiologic saline solution and then strain them onto a sterile piece of gauze after which they may be gently scraped into the wound. It does not matter if some of the culture medium is transferred along with the maggots.

4. The maggots must be confined within the area in which they are planted, and for this purpose a fine mesh bronze wire cage is constructed so that the edges are turned down and taped securely to the surrounding skin of the patient (Figs. 2 and 3). It is so difficult to confine the maggots for any appreciable length of time that it is easier first to strap the cage in place over the wound and then introduce the maggots through a small trap-door cut in the top of the cage. This may be securely taped so as to prevent the escape of the maggots through its opening.

5. After the first twelve hours it is unnecessary for the patient to continue to wear the cumbersome wire cage, and perforated cellophane may be substituted.

6. The number of maggots used is in accordance with the size of the wound to be treated. Roughly, half a bottle or six hundred maggots are used for the ordinary osteomyelitic jaw.

7. After implantation the maggots require about six hours to become accustomed to their new environment, after which their significant growth and effectiveness take place. Usually on the fifth day most of them will have died, at which time it is well to flush the wound with physiologic saline solution and implant a fresh supply.

8. If the edges of the skin are irritated, the patient may be allowed to rest for twenty-four hours before further treatment is begun.

9. The temperament of the patient has a great deal to do with the toleration of the treatment. Some patients do not complain at all, whereas others must be given quarter grain doses of morphine in order to withstand the treatment, and even then they complain of the biting sensation. In only one case have I seen the maggots invade the oral cavity but the patient did not complain greatly.

Maggot therapy greatly shortens the duration of osteomyelitis. In fact, in one outstanding case in my experience, the suppurative process was completely healed within seven days of the first application, and the patient was able to return to his employment.

Report of Cases

Case 1—Mr. B. (Figs. 3, 4 and 5) was hospitalized following a fall in which he sustained a basal skull fracture, a zygomatic and maxillary fracture, and a compound fracture of the left mandible.

History—Owing to the seriousness of the patient's condition, nothing could be done for two days, during which time an acute osteomyelitis developed in the mandible. The acute process resulted in the loss of an inch and a half of the body of the mandible, which was replaced by a bone graft at the proper time.

The posterior fragment grew well but a small area of infection, developed at the junction of the graft and the anterior part of the mandible, discharged through a sinus. Gentle curettement produced a small sequestrum but the chronic infective process was unabated, and the loss of at least a part of the graft seemed likely.

Treatment—Wide incision and packing for twelve hours followed by intensive maggot therapy over a period of sixteen days resulted in complete eradication of the subacute disease and in saving of the bone graft.

Case 2—Mr. H. had sustained a compound fracture of the right mandible through the mental foramen.

Treatment—The fragments had been approximated by means of wires passed through holes bored in the bone, the treatment having been done through an external incision. Osteomyelitis was a sequela; a sequestrum was well defined in ten days. An incision well under the shadow line of the jaw was carried down to the bone and the sequestrum lifted out.

Introduction of Maggots—The pack was removed on the second day and five hundred maggots were introduced. Fixation of the jaw was accomplished by means of a vulcanite splint.

Course—The wound appeared to be so clean and free of infection on the fifth day that it was allowed to close without further treatment. The splint was removed on the fifteenth day and the fractured area was found to be so rigid that the splint was not replaced. This case required less time to heal than any within my experience.

Case 3—The third case is that of an osteomyelitis developing after the simple extraction of a lower left third molar.

History—The ramus and body of the mandible around to the cuspid of the opposite side were completely necrotic when I first saw the patient. The disease had been in progress for two months. There was complete destruction of the bone with no evidence whatever of regeneration.

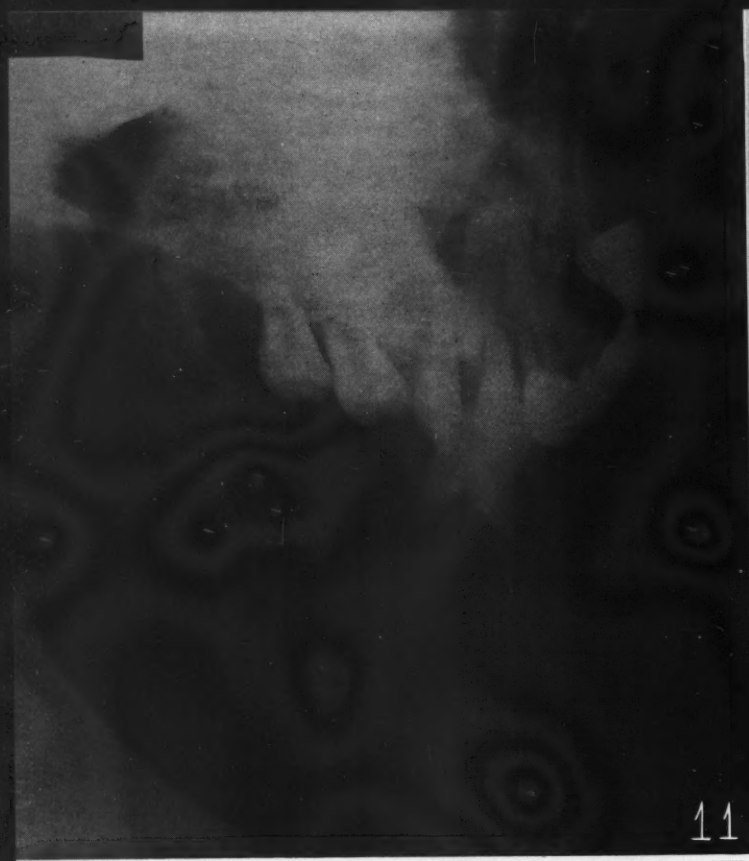
Operation—The first operation consisted of passing a large perforated tube along the buccal surface of the mandible, emerging at the angle of the jaw and the mental foramen. Another tube was inserted upward beneath the parotic gland to the upper border of the ramus. Good drainage was obtained in this way. There was, however, no evidence of the beginning of an involucrum after another month of intensive treatment.

Introduction of Maggots—The original wounds were then enlarged and maggots introduced. There were three teeth below on the right side by which rather insecure stabilization was gained by wiring. The patient remained toxic, however, and continued to lose strength and weight. The picture was that of such an overwhelming infection that no repair could take place until the removal of at least a large part or all of the sequestrum. The toxic condition of the patient now made it necessary to rid him of the infection at the cost of bringing about a deformity.

Maggot Therapy Repeated — The wounds from which the drainage tubes protruded were enlarged and packed and maggots were implanted. Eversion of the soft tissues (Fig. 6) began almost at once and the entire mass of necrotic bone was exfoliated en masse within a few days. Pus formation stopped and the wound appeared to be perfectly clean after four plants of maggots, covering a period of sixteen days.

Course—Once freed of infection, the production of new bone was phenomenal. Within two weeks it was possible to remove the fixation wires so that the patient could eat soft foods. Recovery was rapid and uneventful. I believe the case may have been prolonged indefinitely had maggot therapy not been used. The maggots not only removed necrotic tissue rapidly but stimulated the formation of new bone to a greater degree than any other agent could have done.

Case 4 (Figs. 7 through 15)—*History*—R. J., a man, aged 30, had had extracted a lower left third molar two months previously. This resulted in an acute osteomyelitis embracing the entire left half of the mandible. The patient had been confined to his bed for a month when I first saw him. Immediately following the extraction of the third molar



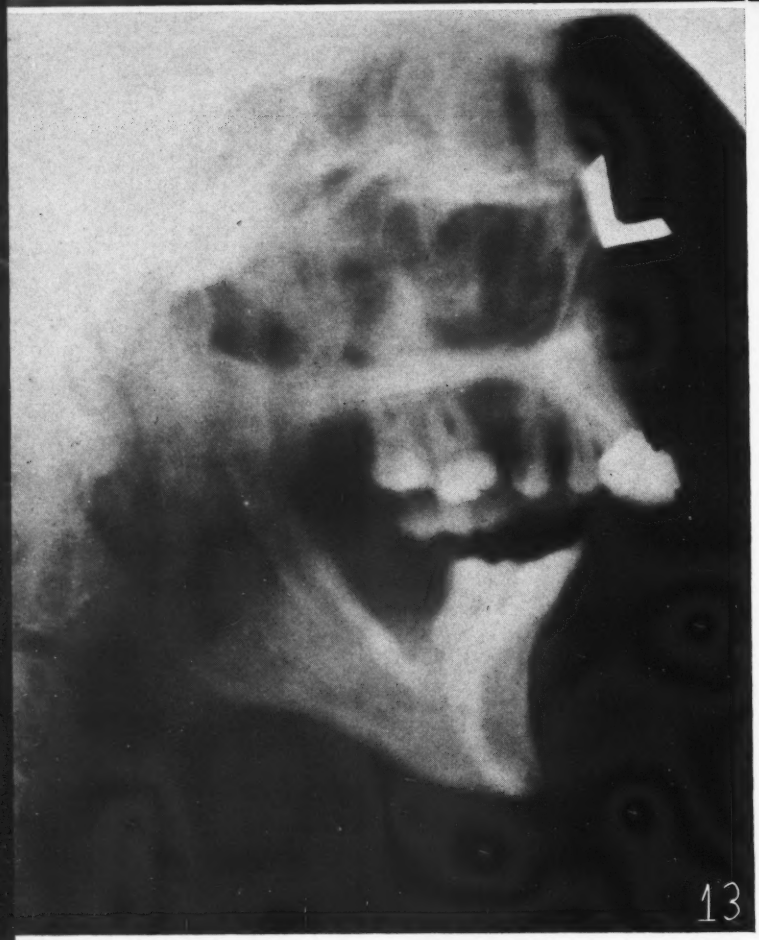


Fig. 11—New bone formation apparent; soft tissues were beginning to heal without drainage.

Fig. 12—Calcification is almost complete. At this time the external wound had been closed for several weeks.

Fig. 13—Complete regeneration of mandible without noticeable deformity.

extreme pain was experienced which was impossible to allay even with large doses of morphine. The patient had been hospitalized for two weeks and a small incision had been made in the buccal fold opposite the third molar socket which was draining copiously. After two weeks of hospitalization during which the most acute symptoms had subsided, he was moved to his home. When first seen the clinical picture was that of a chronic osteomyelitis of the mandible without external fistulas.

Examination—Because of the long duration of the disease there was pronounced exhaustion, anemia, and loss of weight. The pulse rate was 100 and the temperature was fairly constant rising to 102° F. in the afternoon. The left mandibular area was greatly swollen and some fluctuation was present. Pus exuded from around the necks of all the teeth from second molar to central incisor. Roentgen examination on March 1, 1936, disclosed complete necrosis of the mandible and ramus. The bone was apparently ready to be exfoliated at this time.

Pathologist's Report—Cultures taken from the drainage produced a mixed growth of nearly all the bacterial flora of the mouth with a short chain streptococcus predominating.

Treatment—1. Under ether anesthesia an incision was made in the skin opposite the lobe of the ear and carried in-

Fig. 14

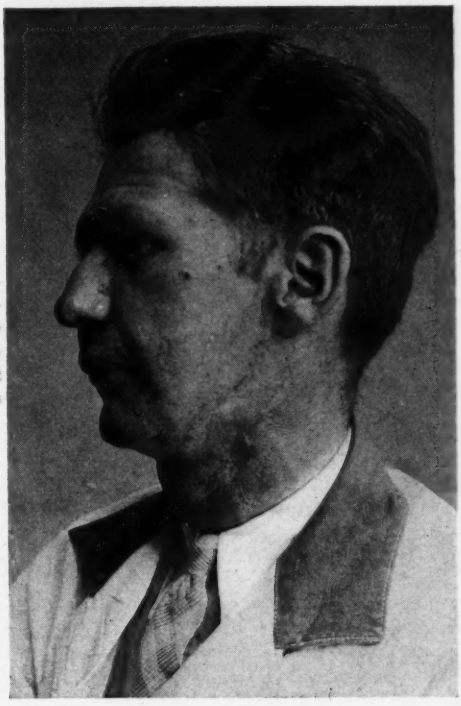


Fig. 15

Fig. 14 and 15—Minimum scarring after entire ramus and mandible on left side had been lost and after treatment by maggot therapy was instituted.

ward by blunt dissection until the ramus was encountered.

2. A large hemostat was pushed upward between the bone and the parotid gland to the upper border of the ramus.

3. Following this a large perforated rubber tube was inserted in the opening and carried upward to the extreme depth of the incision in order to drain the upper part of the face.

4. An incision was made down to the bone at the angle of the jaw and another one at the site of the mental foramen, and these two openings, connected by the insertion of rubber tubing, were placed in contact with the bone.

5. The third molar socket within the mouth was opened wide in an upward direction so that a wide strip of gauze could be carried upward on the lingual surface of the ramus for drainage of this area.

Course—Up to this time the roentgenograms showed no indication that an involucrum was beginning to form. It was hoped by free drainage the formation of new bone would be encouraged and that the sequestrum could be retained until such time that new bone would support the tissues and prevent a great amount of deformity. During the succeeding six weeks of supportive treatment the patient rapidly lost strength and weight to such an extent that it became apparent that the sequestrum would have to be removed in order to lessen the extreme toxicity.

Under local anesthesia the incision made for the reception of the rubber tube at the angle of the jaw was enlarged and packed with gauze for twelve hours.

Introduction of Maggots—The following day the gauze was removed, 500 maggots were introduced and confined to the area by means of a wire cage which in turn was held in place by adhesive tape. The patient complained of the biting sensation so that morphine had to be used to make him comfortable for the next four days. After the first day the wire cage was removed and perforated cellophane was substituted for the comfort of wearing a flexible dressing. At the end of the fourth day the teeth of the opposite side having been wired to stabilize the jaw, the wound was found to be widely inverted and the sequestrum at the angle of the jaw almost eaten away by the maggots. The eversion of the wound permitted the removal of the remainder of the necrotic bone without difficulty. Inasmuch as there was considerable bleeding the wound was again packed for twelve hours and another plant of 500 maggots were introduced. At the end of the fourth day following this second implantation of maggots the wound was found to be clean with healthy granulation tissue springing up along the bed of the sequestrum. The patient rested for three days with a gauze pack in place and maggots were again introduced for a period of three days. Following this last maggot treatment there was complete cessation of pus formation with rapid healing of the soft tissues.

May 1, 1936, the roentgenogram definitely revealed the beginning of the formation of new bone, and the last roentgenogram shows complete regeneration of both mandible and ramus.

Comment—The use of maggots in this case greatly facilitated the removal of the sequestrum and cleaned the wound rapidly after the necrotic bone was out of the way. I believe maggot therapy shortened this illness a great deal and facilitated the deposition of new bone much more rapidly than would otherwise have occurred.

CASE 5—*History*—Mr. B. had sustained a fall from a third story window and when first seen in the hospital one week after the injury was still unconscious. Because of his serious condition nothing could be done in the way of repairing the fractures for two weeks after his admission into the hospital, and in the meantime a severe infection developed in the left mandible.

Examination — Roentgenographic examination revealed a fracture at the base of the skull, a fracture of the left zygoma including the floor of the orbit, and multiple fractures of the left mandible.

Treatment—A series of operations somewhat restored the facial outline except that the left eye could never be raised to the exact level of the right.

Two inches of the mandible were subsequently lost on the left and a part of the twelfth rib was used as a graft to replace the bone lost, after a suitable period had elapsed. On the fifth day following the insertion of the bone graft the wound which had been closed without drainage began to open in a manner suggestive of infection and the possible loss of the new bone. Constant irrigation with surgical solution of chlorinated soda modified with sodium bicarbonate produced no results.

Maggot Therapy—The wound was opened wide to expose the anterior part of the graft and 500 maggots were implanted. Maggot therapy was carried out during the following eight days after which the wound and graft appeared to be clean and healthy. Healing progressed uneventfully and the rib was retained in perfect position.

Conclusion—It is evident that had the infection following the bone graft been allowed to progress further without the use of some radical measure, such as maggot therapy, the bone graft in this case would have been completely lost and grafting would have had to be repeated. Maggot therapy, I believe, was the agent

(*Continued on page* 434)

TACK OPERATION

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DENTISTS often experience failure in denture construction because of abnormal scar tissue and muscle attachments or insufficient ridge areas to stabilize the dentures. I have tried many textbook methods of eliminating scar tissue, abnormal muscle and frenum attachments but none proved as satisfactory as a method that I developed several years ago. This method may be called, "The tack operation for eliminating unsatisfactory muscle and scar tissue attachments and improving and increasing the prosthetic base."

Tacks, nails, screws, wire, and dowels have been used in bone surgery for years. Tacks have been and are used to hold tissue flaps; wire and clips, to suture and hold tissues in place.

A patient presents himself for denture construction. The dentist finds frena attached over the ridge crests, or scar tissue attachments of the buccal tissues to the crest of the ridge in the bicuspid and molar regions. These attachments may be due to a scarifying of the buccal tissues at the time of extraction; contact with these raw abraded surfaces resulted in a uniting and formation of scar tissue, occasionally completely obliterating the muco-buccal fold and causing an unsatisfactory prosthetic base. Dentures built up with modeling compound to be worn after dissection of tissues have not been entirely satisfactory.

It occurred to me that if a positive stationary barrier could be held in place between raw surfaces, after these attachments have been dissected and clipped off and until new epithelium covered the wounds, the problem might be solved. I have accomplished this with a barrier of surgical cement held by the heads of small tacks which have been placed in holes drilled through the cortical plate of the alveolar process and then tapped to tighten them, their heads being left exposed for retention of the cement packs.

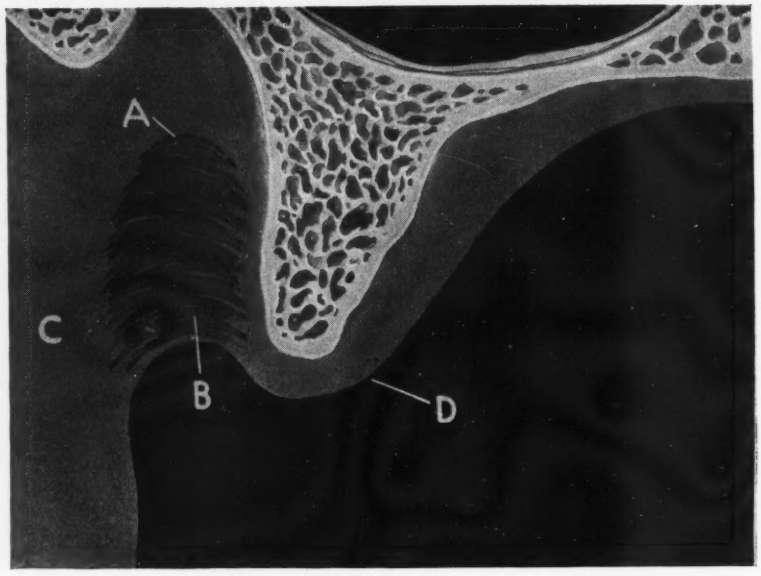


Fig. 1—A, Normal height of muco-buccal fold; B, abnormal scar or muscle attachment; C, buccal tissue; D, alveolar ridge.

TECHNIQUE

1. Anesthetize tissues in operative area.

2. Dissect back from the ridge the fan-shaped tissue attachments up to the height of the muco-buccal fold. This leaves exposed the alveolar process and the raw facial or buccal surface.

3. A small spear is shaped by grinding a number 0 round bur to a three-sided spear or by the use of a number 2 Beutelrock drill. In the exposed alveolar bone drill two holes

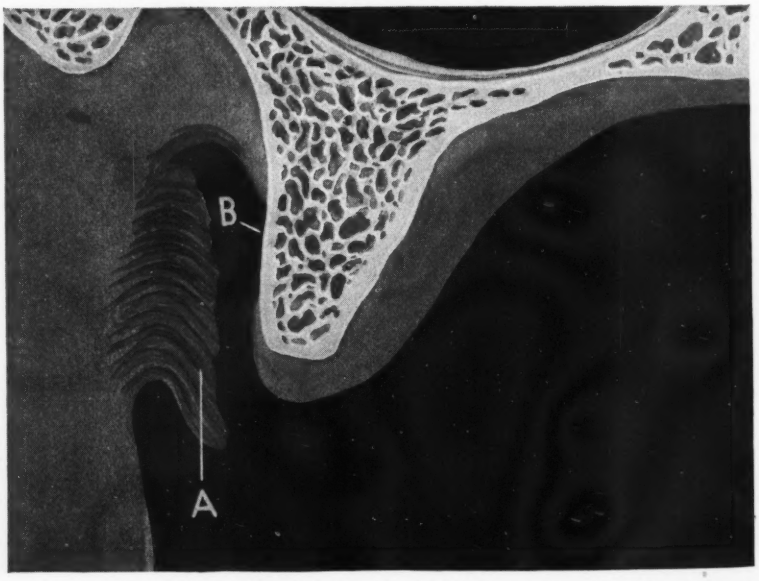


Fig. 2—A, Abnormal attachment dissected from alveolar process, now a loose flap in buccal tissue. B, Exposed alveolar process.

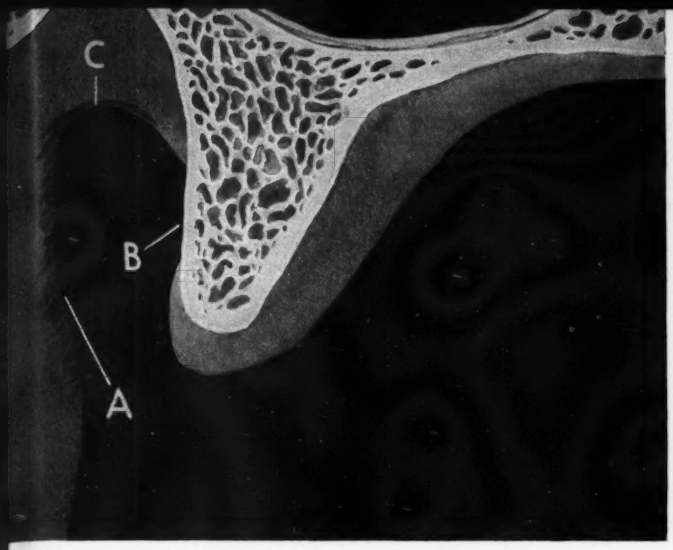


Fig. 3—A, Abnormal tissue clipped from buccal tissue; B, Exposed alveolar process; C, Height of muco-buccal fold.

with this spear about 1.5 mm. deep through the cortical plate and about half way between the crest of the ridge and the muco-buccal fold.

4. Sterilized number 2 upholsterer's tacks are placed one in each drilled hole.

5. Tap with plugger and mallet to tighten tacks and leave the heads projecting 3 or 4 mm. (The holes must be drilled and the tacks set in and tightened.) The operator should bear in mind the anatomy of the area and avoid sinus walls by keeping tacks low. Small stainless tacks may be used but there is no contra-indication to using the ordinary iron tacks.

6. Surgical cement is now mixed rather thick and spread around the heads of the two tacks and extended to the muco-buccal fold, being molded with the cheek tissues. This pack is to cover all raw alveolar surfaces. When the pack sets, a positive immovable barrier replaces the abnormal tissues and prevents reattachment of raw surfaces. The pack is left in place twelve or fourteen days during which time the operator may peek at the buccal side of the wound to see how it is covering.

7. The pack is then teased off with an instrument. The tacks will come off with the pack; the buccal tissues will be seen to have healed and the alveolar surface to have closed over under the pack.

8. The patient is told to blow the cheeks out when rinsing the mouth for a few days, and the operation is complete.

Significant Points

Two or more tacks should always be used. The tacks should be placed near the crest of the ridge away from the sinus and the holes should be drilled just through the cortical plate about 1.5 mm. deep. When the tacks are placed they should be wedged slightly with plugger and mallet. The

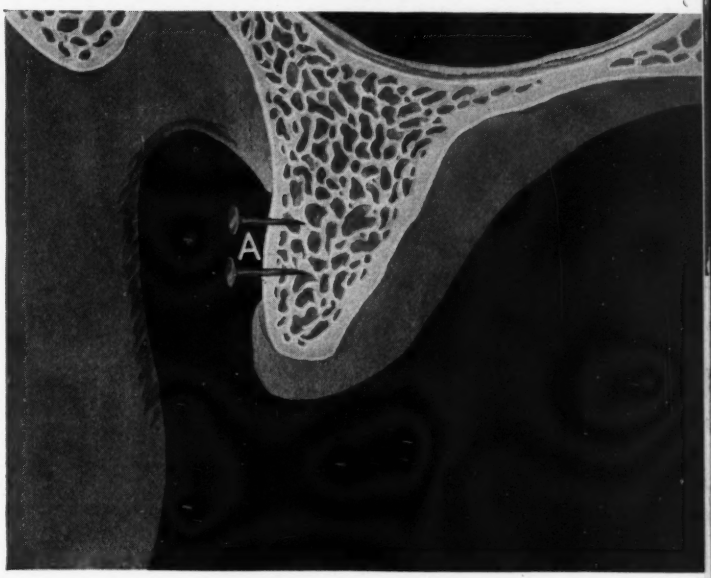


Fig. 4—A, Holes drilled through cortical plate and number 2 upholsterer's tacks placed and tightened.

Fig. 5—A, Surgical cement pack around heads of tacks and up to muco-buccal fold.

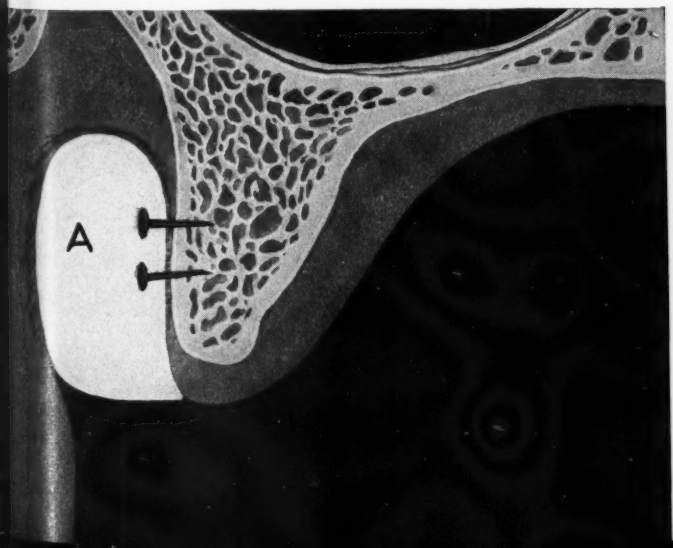
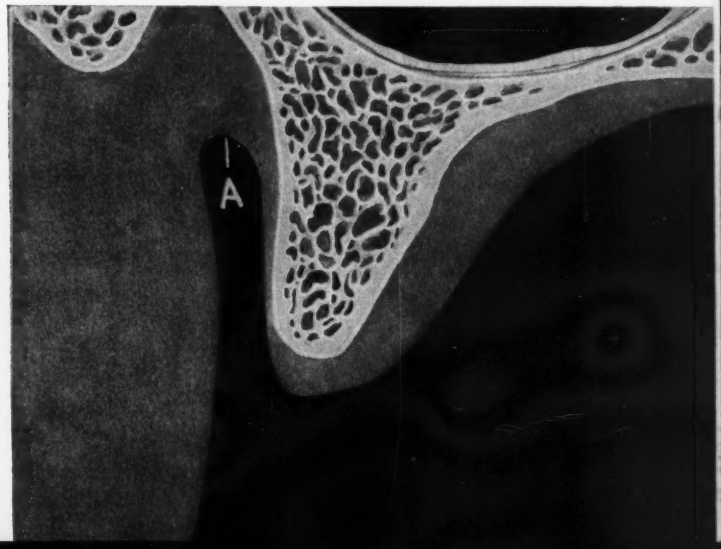


Fig. 6—A, Completed operation. Norma muco-buccal fold.



surgical cement is spread around the tack heads and molded to the desired barrier. Contact of cheek tissues keeps the pack and tacks in place.

SPECIAL CONDITIONS

In selected cases I have used the method described to raise the muco-buccal fold by making an incision parallel to the ridge and 4 or 5 mm. from the crest; loosening the tissues up to the muco-buccal fold, and then undermining the muco-buccal fold, so that it can be pushed up higher. This will leave an exposed area of alveolar process. The tacks are inserted and the cement is placed and molded to the new height of the muco-buccal fold. New tissue will form under the pack to bridge the exposed alveolar process.

For the removal of abnormal frenum when anterior teeth are present, the frenum is dissected and the pack barrier is molded, the pack material being locked through the interproximal space. In some cases one tack may have to be placed carefully between central roots to give the pack stability.

CONCLUSION

Tacks and packs have proved more satisfactory in my hands than suturing or denture rims built up with modeling compound. With a little caution any operator can use this method and many unsatisfactory bases can be improved with little discomfort to the patient and a great deal of satisfaction to both the operator and the patient.

401 Black Building.

SILICATE CEMENTS: BEHAVIOR AND TECHNIQUE

(*Continued from page* 425)

mix should be scraped up on the spatula and held close to the cavity by the assistant to prevent carrying small amounts through the air. Pack into the cavity from one entrance, using small amounts at a time (Fig. 4).

11. Hold motionless with the celluloid strip until hard as tested with a small amount of excess; then cover with cocoa butter, working the cocoa butter interproximally by drawing the celluloid strip back and forth.

12. In a few minutes wipe off the excess cocoa butter and apply a liberal coating of varnish.

13. Finishing should be delayed as long as possible, preferably until a subsequent sitting. Fine discs or strips should be used with an easy motion; plenty of cocoa butter used as a lubricant will prevent frictional damage.

SUMMARY

1. Slow-setting restorations, because of acid concentration, should be isolated from the pulp.

2. Avoid compression with a restoration on a thin pulpal wall.

3. Phenolize the cavity before placing the restoration but dry in the phenol with an air blast.

4. Cavity margins should be made smooth and at right angles to the surface.

5. Remove the liquid from the bottle as quickly as possible and replace stopper.

6. Restorations that set rapidly have a more diluted liquid, and look well but have a greater shrinkage. The shrinkage idea has probably been over-emphasized.

7. The mixing puddle should be kept small and no time should be lost after the mix has been started.

8. Thick mixes seem to shrink less than thin mixes, but plasticity is more important than a mix that is too thick.

9. Avoid drying out of material, especially in early stages.

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STERILE SURGICAL MAGGOTS

(*Continued from page* 431)

in saving the surgery and preventing further delay and operative procedure.

CONCLUSION

It was not the purpose of this article to create the impression that maggot therapy is the one accepted treatment for osteomyelitis of the jaw, but rather to stimulate interest in an old and thoroughly proved agent of the art of healing which is a valuable adjunct of surgery. If a necrotic mandible can be rid of its sequestrum and healthy granulation tissue made to take its place within a few days, without injury to the patient, the agent effecting this has a definite place in the treatment of bone infections.

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SUPPLEMENTARY BIBLIOGRAPHY:

Goldstein H. J. Maggots in the Treatment of Wound and Bone Infections, J. Bone & Joint Surg. 13:476 (July) 1931.

Maggots in the Treatment of Infected Wounds, Complicated Fractures Osteomyelitis and Tuberculous Abscesses, Med. Rev. of June, 1931, pages 327-332.

McLellan, N. W.: The Maggot Treatment of Osteomyelitis, J. Canadian M. A. September, 1932, page 256.

Livingston, S. K. and Prince, L. H.: The Treatment of Chronic Osteomyelitis, J. A. M. A. 98:1143 (April 2) 1932.

Wilson, E. H.; Doan, C. A., and Miller, D. F.: The Baer Maggot Treatment of Osteomyelitis, J. A. M. A. 98:1149 (April 2) 1932.

Robinson, William: Stimulation of Healing in Non-Healing Wounds, by Allantoin Occurring in Maggot Secretions, J. Bone & Joint Surg. 17:267 (April) 1935.

The Editor's Page

ONE of the notable advances in technical dentistry in the last decade is the development of the immediate denture. Not the least important factor in this advancement is the psychologic one. Before the general use of the immediate denture, people were cast into the world following full extractions with their faces distorted, masticating function destroyed, and their personalities affected. The loss of teeth was more than a physical loss. It represented in the minds of the patient and his friends a climacteric—an epoch in the life of the person when he was forced to show that the aging process was definitely upon him. People dreaded the loss of their teeth but they dreaded the edentulous stage more—the stage between naturalness and artificial reproduction. In that age of denture prosthesis when small, white, regular teeth were set end-to-end with an exactness never possessed by the natural teeth, the artificiality of the final denture was emphasized and therefore dreaded by the patient as much as the transitional stage was dreaded.

Some of the difficulty was due to the fact that satisfactory teeth were unavailable; part of the difficulty came from failure to appreciate the esthetic requirements. Lack of understanding of the human personality was largely responsible. Now dentists have satisfactory materials with which to work. Teeth are available which look natural in shade and contour. Dentists have been taught the appreciation of the esthetics of denture construction. The personality of the patient is now taken into consideration; his personality needs are evaluated; he is spared embarrassment. We are trying to make the transition from natural teeth to dentures with a reduction of physical shock and with freedom from psychic trauma. The immediate denture carries the patient immediately through to artificial dentures; he skips the edentulous stage.

Immediate dentures have passed mere experimentation. The immediate upper denture construction, before the remaining upper teeth are removed, has been clearly and amply described by Jaffe, Hardy, and Stiker in the pages of this magazine. An appraisal of the advantages of the immediate denture suggests the following:

1. The immediate insertion of the denture acts as a splint or bandage, thus protecting the alveoli against trauma; the denture acts as a pressure appliance to control hemorrhage.

2. The denture molds the tissue under pressure into a regular form which cannot be attained by the chance healing of the alveoli.

3. The maintenance of a blood clot in the socket protects the underlying bone from irritation and thus postoperative pain is controlled.

4. Immediate dentures supply a proper occlusal rest because proper intermaxillary relationships are maintained and habitual functional paths are kept intact. In this way centric relationship is more easily established.

5. Immediate insertion of dentures prevents muscular adhesions from forming.

6. It is a common occurrence for the tongue to enlarge during the completely edentulous stage. Subsequently when dentures are constructed the enlarged tongue is a source of annoyance and a mechanical hazard to denture function. Immediate dentures eliminate this hazard because they prevent the tongue from enlarging. This point may require some elaboration:

When the teeth are in position, they act as a stop and support to the tissues of the lips and cheeks; they also "restrain" the tongue. When the teeth are removed, the lips and cheeks collapse toward the ridge and the tongue expands toward the ridge. With the loss of teeth, then, the cheeks and lips encroach upon the ridge area from without and the tongue encroaches upon the ridge area from within. In placing an immediate denture these muscular forces remain inoperative; there is no displacement of tissues by the collapse of the facial muscles inward and the enlargement of the tongue outward. The immediate denture, therefore, preserves the tonus of the facial and tongue muscles.

7. Finally, there is a thoughtful advantage in constructing an immediate denture for a patient in that none of his friends or relatives ever sees him in the edentulous state. This psychologic factor should be borne in mind along with the mechanical reasons for advocating immediate dentures.

Immediate dentures are no longer in the experimental stage. They are indicated and can be reassuringly recommended to patients faced with the loss of natural teeth.

Fig. 1—Diatoric tooth; diatoric tooth with biscuit-bake gingival porcelain tip; porcelain pontic with its gold cradle.
Fig. 2—Diatoric tooth attached to compound handle, also wrapped with paper ready for packing porcelain.
Fig. 3—Adaptation of diatoric tooth to edentulous ridge before addition of medium-fusing porcelain.
Fig. 4—Diatoric tooth with gingival tip of biscuit-bake porcelain ready for grinding.

MODIFIED FIXED BRIDGEWORK*

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THE purpose of this article is to present a method of handling two rather difficult situations in the replacement of teeth by means of fixed bridgework. The first is that of replacing the lower first or second molars (or both) without the display of gold on the occlusal surfaces. The second problem is that of replacing a lower central or lateral incisor when these teeth are placed in an arch presenting anterior diastemata.

The Modified Lower Molar Pontic

The long-pin baked porcelain tip pontic (Tinker type) is an extremely satisfactory type when it is properly constructed. It does, however, present the problem of esthetics when it is used to replace the lower first and sometimes the lower second molars. The display of occlusal gold on the pontic is sometimes objectionable to critical patients.

The method of construction herein described to eliminate this objection is not recommended as a routine procedure. It is indicated for those patients who demand an esthetic result not obtainable by the use of the ordinary type of pontic. An all-porcelain bridge will, to be sure, eliminate gold display entirely; however, this type of bridge is of doubtful strength and requires drastic cutting of the abutment teeth. It is indicated only in those cases in which abutment teeth are badly destroyed.

The recommended pontic has inherent strength because it is a solid mass of porcelain encased in a cradle of gold. There are no pins, pin holes, or grooves which would tend to establish lines of cleavage and thus render the porcelain more susceptible to fracture. The gold cradle completely encircles the pontic but the gingival tip of highly glazed porcelain is allowed to protrude through the cradle so that it may contact the edentulous tissue (Figs. 6, 7, and 8). This plan of construction permits of an occlusal surface of porcelain for esthetics and a gingival tip of highly glazed porcelain, the hygienic advantages of which are understood.

That portion of the gold cradle which encircles the pontic on the buc-

*Photography for this article was prepared by A. Lawrence Dunn, D.D.S., Santa Barbara, California.

Fig. 5—Porcelain pontic ground for gold cradle.
Fig. 6—Finished cradle and porcelain ready for soldering to abutments. Note glazed porcelain contacting tissue.
Fig. 7—Completed bridge.
Fig. 8—Completed removable type.

cal surface is inconspicuous and in almost all cases invisible. From the standpoint of porcelain strength, it is absolutely essential completely to encircle the porcelain with gold; otherwise tortional stress will invariably fracture the porcelain.

The pontic can either be soldered to the inlay abutments or placed within them by the use of internal precision attachments. (Fig. 8 illustrates the removable type.) If the bridge is made removable, it can be used by the patient as a fixed bridge and removed by the dentist when the patient is called for periodical prophylactic treatment. In the event of unforeseen fracture of the pontic the removable type would facilitate repair.

Technique

The method of construction is rather simple:

1. A vulcanite diatoric tooth of proper mesio-distal and bucco-lingual dimensions is chosen and ground so that it will allow plenty of room on the gingival for the addition of medium-fusing porcelain (Fig. 3). This is readily accomplished by sticking the tooth to a piece of compound (forming a convenient handle, Fig. 2) and wrapping some glazed paper around the tooth and the compound to form a matrix of sufficient height in which may be formed a porcelain tip long enough to grind to the edentulous ridge (Fig. 2).

2. Into this matrix, containing the diatoric tooth, medium-fusing (2300° F.) porcelain is packed and vibrated.

3. The paper matrix is carefully removed; the vulcanite tooth with the porcelain condensed on the gingival aspect is detached from the compound handle, placed in the porcelain furnace, and brought to a high biscuit-bake (Figs. 1, 2, 3, and 4).

4. The diatoric tooth with its baked root is ground to the ridge in the form of a tip rather than that of a saddle.

5. The tooth is then ground to approximate occlusion with the upper teeth on the working model.

6. This pontic with its prepared porcelain tip is then placed in the furnace and brought to a high glaze.

7. After the gingival tip has been glazed the pontic is prepared for the construction of the gold cradle into which it will later be cemented.

8. On the mesial and distal the porcelain pontic is ground to provide for trusses for soldering purposes. These preparations for the trusses are connected to the buccal and lingual portions by grinding these areas to complete the circle. The operator should be careful not to mar the glaze already baked on the gingival tip.

For esthetic reasons the preparation on the buccal should be kept as far gingivally as possible. On the lingual portion, which is inconspicuous, it should be carried as far occlusally as is feasible, because this will provide for greater porcelain support (Fig.5).

9. The ground surfaces are carefully smoothed with sandpaper discs; the pontic is lubricated and the cradle

waxed; the pontic is removed and cast in gold which is hard and tough inasmuch as the casting cannot be thick (Figs. 6 and 7).

10. The cradle is fitted to the porcelain pontic, polished, and soldered in the usual manner. After cementation of the bridge in the mouth, the pontic can be readily corrected for articulation and occlusion.

If the pontic is made removable the usual method of paralleling the precision attachments is employed; the male portions of these attachments are soldered to the truss portions of the cradle (Fig. 8).

Modified Lower Anterior Fixed Bridge

Fortunately dentists are not required to replace a lower central or lateral incisor as frequently as the upper central and lateral incisors. The replacement of these lower incisors becomes especially complicated when these teeth are separated by spaces (Fig. 12).

This article is confined to the replacement of a lower spaced central incisor by means of fixed bridgework. If this type of case presents missing posterior teeth a removable appliance would probably be satisfactory both esthetically and mechanically. Should the lower central incisor, however, be the only missing tooth in the entire arch, the removable method of replacing this tooth is not practicable.

The greatest difficulty encountered in the construction of this bridge is in the making of the pin-inlay preparations in the abutment teeth. Because of the size of the crowns in relation to pulp size in these lower incisors, all operative procedures on these teeth must be carefully performed. When properly executed the esthetic result in the finished bridge is gratifying (Figs. 10, 11, and 12).

Preparation of Abutments

The pin-inlay type of abutment is the most satisfactory means of anchorage for this bridge. When carefully planned these abutment teeth need not display any gold.

1. With a small stone a slight amount of enamel is removed from the lingual surface of the incisor tooth. The operator should be careful not to carry the preparation too near the incisal edge. If the incisal margin of the preparation encroaches too near the incisal edge of the tooth, it will become necessary to carry the gold over the incisal edge because of unfavorable enamel rod direction. This would produce an unsightly result.

2. The preparation is carried into the interproximal region on the side of the preparation encroaches too is kept far enough to the lingual to prevent the gold from being seen from the labial aspect after the bridge is completed.

3. The distal portion of the preparation is carried only as far as the disto-lingual marginal ridge where it is terminated as a finishing line.

4. The preparaton is carried gingivally and is terminated as a finishing line a little above the cemento-enamel junction (Fig. 9).

Thus far only a slight amount of tooth structure has been removed; in fact, it is unnecessary to go through the enamel in establishing this part of the preparation.

5. The next step in the preparation is to establish extremely small grooves on the disto-lingual, incisal, and interproximal areas. This is accomplished by using a small sharp knife-edged stone. The result produced is that of a staple as in the regular three-quarter veneer crown, which has the effect of strengthening and bracing the finished casting to prevent it from spreading.

6. The retentive feature of the abutment is afforded solely by the use of two small holes, one in the gingival area and one in the disto-linguo-incisal area. These holes must be accurately made, small in diameter, and shallow (not more than 1.5 mm. in depth). They can be conveniently started with a number ½ round bur and finished with a number 699 fissure bur.

7. The entire preparation is then smoothed with fine sandpaper discs: care must be taken to leave the margins in the form of finishing lines, not shoulders (Fig. 9).

Wax Pattern Technique

The wax pattern for the pin-inlay technique must be carefully made. The direct technique in my hands seems to be the most satisfactory in the making of almost all wax patterns.

1. A seamless copper band is selected which is slightly larger than the tooth. It is trimmed and contoured to proper size and form.

2. This band is lubricated and filled with inlay wax, and that portion of the wax which is to be forced onto the preparation is allowed to remain soft whereas the opposite end is cooled until it is fairly hard in order that it may act as a plunger forcing the soft wax ahead of it into all parts of the preparation.

3. After the copper band with the inlay wax is forced onto the preparation, it is chilled, while under finger pressure, with cold air or water.

4. The copper band is then slit on the labial surface and removed carefully so as not to dislodge the wax pattern.

5. The pattern is then carved to proper contour and the margins are carefully trimmed.

6. To insure the wax being forced to the full depth of the pin holes a dull explorer is heated and forced through the wax pattern into the bottom of these holes. Capillary attraction will carry the wax to the desired depth.

7. Sprue the wax pattern while it is still on the tooth; remove, invest, and cast in a hard gold.

After the two abutment inlays are fitted and polished sufficiently to assure margins that will properly register, a plaster impression is taken and the inlays are placed in their respective positions in this impression. Into this is run a hard stone model.

Construction of Pontic and Backing

1. A long-pin facing carefully selected for shade and size is ground to the model for length.

2. A gingival tip of medium-fusing porcelain is baked on this facing and ground to the ridge.

3. Following this an incisal tip of porcelain is added and baked for esthetic reasons.

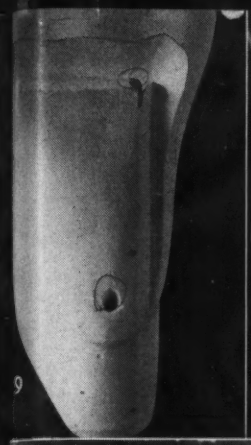
4. The entire facing is properly shaped and the incisal and gingival tips of medium-fusing porcelain are placed in a furnace and brought to a glaze.

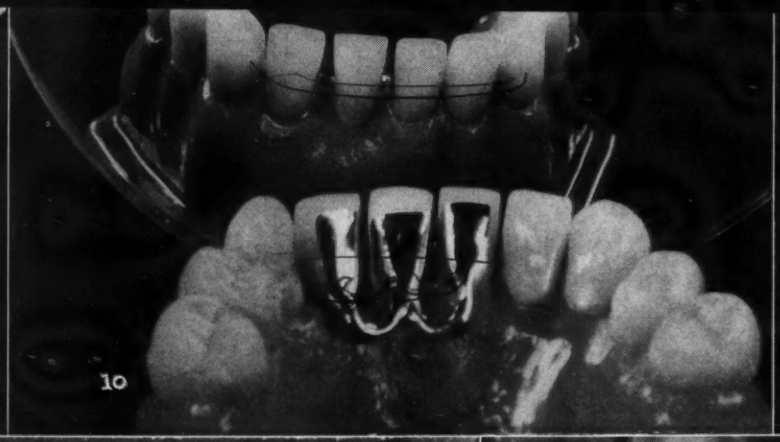
5. The porcelain pontic is now properly alined and oriented to the model; a labial core of plaster is made to hold it in position for waxing.

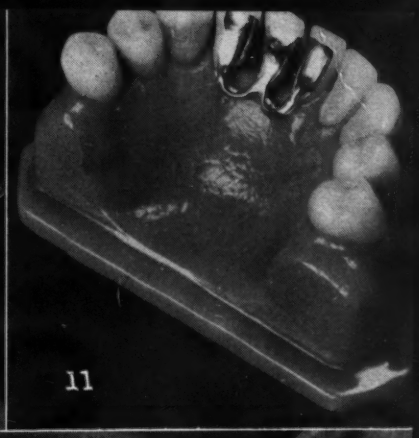
6. The linguo-gingival area of the porcelain tip is ground with a long bevel sloping abruptly to nearly the tissue area in order that the lingual connectors may be waxed to the backing in this region.

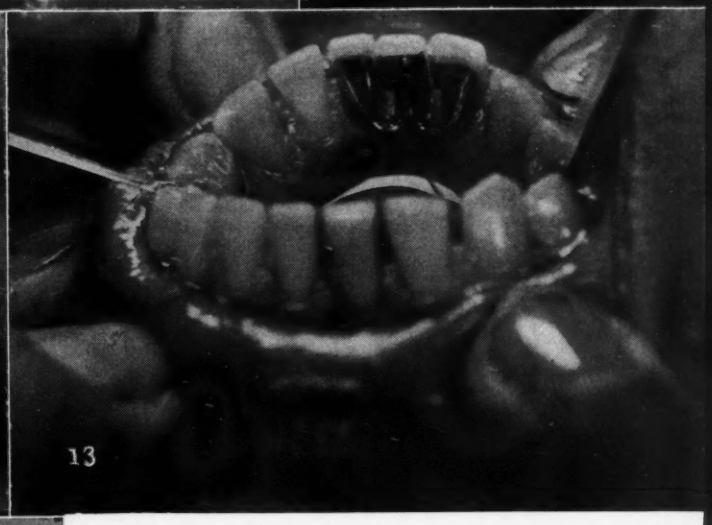
7. After the backing of wax is constructed the lingual connectors are formed with wax in a manner shown in the finished bridge on the typodont (Figs. 10 and 11). These connectors are waxed slightly heavier than desired to allow an excess of gold after casting for shaping and polishing.

8. After the porcelain pontic is carefully removed the wax backing with its connectors is invested and cast in a hard gold. The casting is then polished and the porcelain pontic is fitted. The connectors are highly polished, especially on the tissue side. If these connectors are slightly rounded and highly polished on the tissue side and allowed to free the tissues about the thickness of a toothbrush









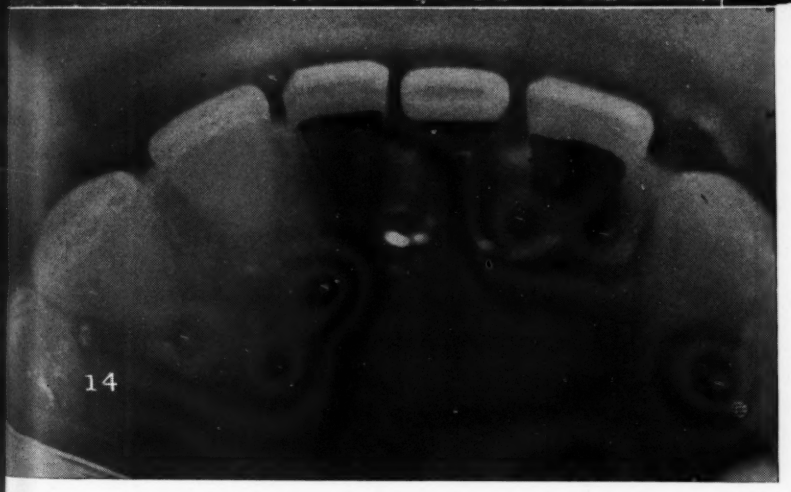


Fig. 9—Preparation for pin-inlay. Note pin holes and grooves; also absence of shoulder.

Fig. 10—Labial and lingual views of completed bridge.

Fig. 11—Lingual view showing connectors attaching pontic to abutment inlays.

Fig. 12—Labial view of practical case made for patient; lower left central is pontic. Note that no gold is displayed.

Fig. 13—Lingual view of bridge in patient's mouth.

Fig. 14—Closeup of lingual view of bridge in patient's mouth. Note incisal staining on pontic.

bristle, they will produce absolutely no tissue irritation and will be comfortable to the patient.

9. The bridge should be assembled in the mouth and held in proper alinement to the pin-inlay abutments with sticky wax and a plaster impression taken from the lingual for soldering. As has been stated the connectors must slightly clear the lingual tissues for cleaning and to allow dental floss to pass freely underneath them. The backing with its connectors is now soldered to the abutment inlays.

The porcelain pontic should be cleared of occlusion and articulation in all movements of the mandible in order to prevent any undue stress on the bridge which has been constructed more for esthetics than for mastication. If the adjoining teeth present characteristic incisal or labial staining, it should be reproduced on the same surfaces of the pontic which will enhance the esthetic value of the bridge (Fig. 14).

The abutment inlays are now corrected for marginal fit and after cementing the porcelain pontic to its backing the entire bridge is cemented into position.

It is well to caution the patient that the construction of this type of bridge is a compromise: strength is somewhat secondary to the esthetic requirement in this bridge.

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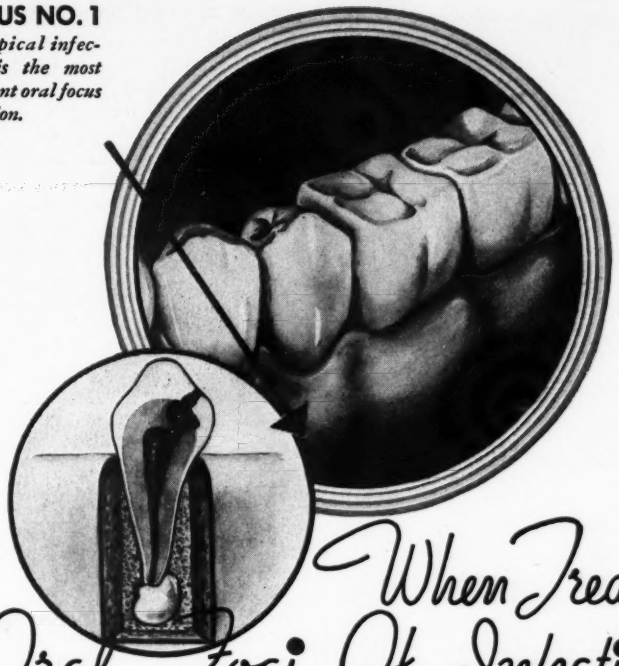

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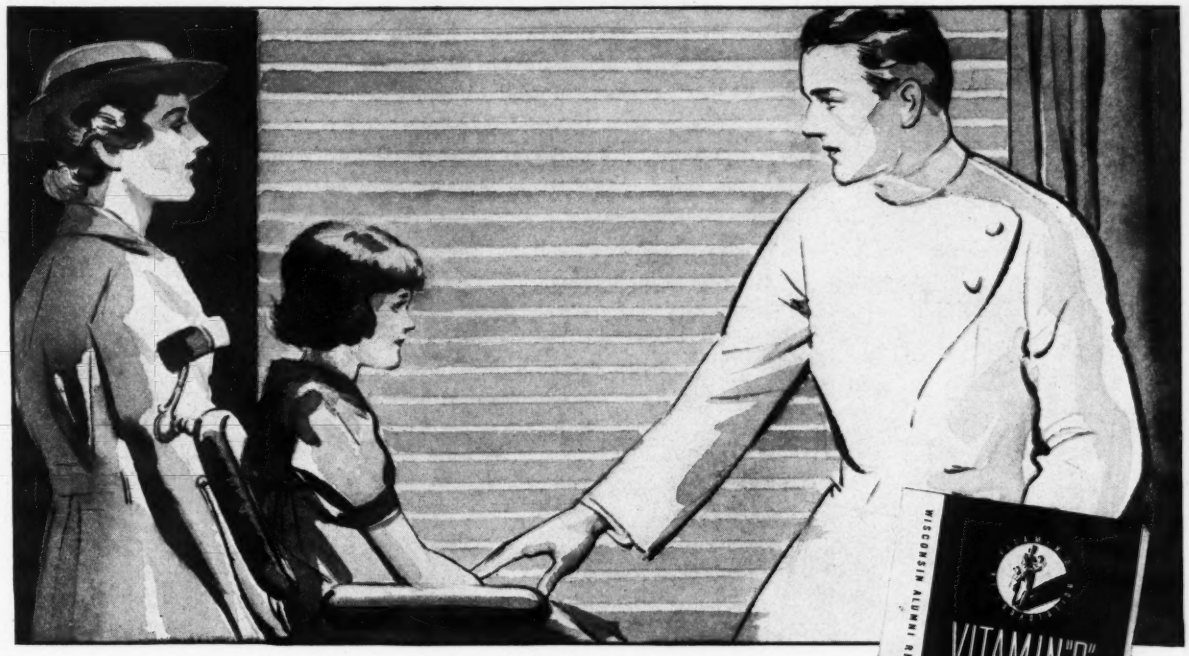

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JOSEPH WILLIAM ROUSH received his D.D.S. in 1919 from the University of California and is a graduate of the Western Normal School. He is a member of the American Dental Association and component societies. Doctor Roush has taught for eleven years at the University of California College of Dentistry in the departments of operative dentistry, oral surgery, and general anesthesia. Doctor Roush also taught for three years in the California Public Schools, for two years at the Western Normal School, and at St. Mary's College. Doctor Roush has a general practice in which he emphasizes oral surgery.

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DOUGLAS H. IRWIN, D.D.S. (Kansas City-Western Dental College, 1923) reported a case of Epulis in October, 1935 and contributed another case report on Osteomyelitis in June, 1936.

E. DAVID SHOOSHAN received his D.D.S. from the University of Southern California Dental College in 1923. Doctor Shooshan is a member of the American Dental Association, the Pasadena Dental Society, and the California State Dental Society, and president of the University of Southern California Dental Alumni Association. Doctor Shooshan has conducted postgraduate courses on Gold Foil. He is Director of the San Diego Gold Foil Club and of two gold foil clubs in Los Angeles, and has a general practice.

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INDEX OF THE PERIODICAL DENTAL LITERATURE (Three years, 1930-1932), Compiled by Arthur D. Black, M.D., D.D.S., Chicago, American Dental Association, 1936.

X-RAY TECHNIC AND INTERPRETATION OF DENTAL ROENTGENOGRAMS (Illustrated), By A. L. Greenfield, D.D.S., Brooklyn, New York, Dental Items of Interest Publishing Company, 1936.

BRAIN REFLEXES AND LAWS OF EXISTENCE, By William D. Hoffman, Los Angeles, California, 1936.

ESSENTIALS OF ORAL SURGERY, Second Edition, By Vilray Papin Blair, M.D. and Robert Henry Ivy, M.D., D.D.S., St. Louis, The C. V. Mosby Company, 1936.

DENTAL PHARMACOLOGY AND THERAPEUTICS (Illustrated), Second Edition, St. Louis, The C. V. Mosby Company, 1936.

ORAL DIAGNOSIS AND TREATMENT PLANNING (Illustrated), Edited by Samuel Charles Miller, D.D.S., with an Introduction by Allen T. Newman, M.S., D.D.S., Philadelphia, P. Blakiston's Son & Co., Inc., 1936.

A TEXT-BOOK OF OPERATIVE DENTISTRY (Illustrated), Second Edition, Revised, By William Harper Own McGehee, D.D.S., M.D., Philadelphia, P. Blakiston's Son & Co., Inc. 1936.

THE PUBLISHER'S NOTEBOOK

THIS month this magazine rounds out its fifth year as an Oral Hygiene Publication. The new DIGEST has been built entirely during depression and the task has not been easy. But through it all, the encouraging note has been the profession's reception of the journal. Currently, the paid circulation is double that of the average for 1932, our first year, and, as I mentioned in this column recently, another source of real encouragement has been the fact that each year more than nine out of ten DIGEST subscribers renew their subscriptions.

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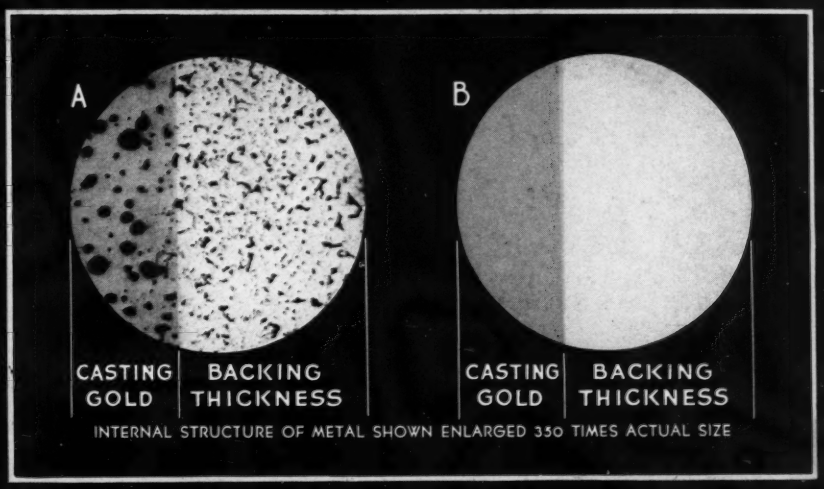

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